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Kurt Becker

*Public Health Department, Berlin, Germany*

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## MUSKRATS IN CENTRAL EUROPE AND THEIR CONTROL

KURT BECKER, Head, Section of Hygienic Zoology, Public Health Department, Berlin, Germany

SUMMARY: An account of the introduction of muskrats into Europe and their spread over the countries of Europe is presented. The reasons why the animal should be controlled are discussed. Legal regulations often do not keep up with the requirements and economic and political circumstances and frequently have encouraged the spread of muskrats. The use of traps alone does not solve the problem of their control. Therefore research is looking for suitable poisons and a good practice to apply them. At present this question cannot be answered satisfactorily.

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For more than a half century muskrats have been pest animals in Central Europe. The literature about this fact is ample and scattered (Hoffmann 1958, 1967). The history of the first introduction of muskrats into Europe is somewhat obscure. According to a general opinion it was in 1905 that Prince Colloredo Mannsfeld released two males and three females in his estate near Dobris, 40 km southwest of Prague, Czechoslovakia. It was presumed that they originated from Alaska. But it is more likely that they came from southeast Canada, for a recent investigation makes it possible that our imported muskrats are related to the subspecies *Ondatra zibethicus zibethicus*. The same is the case with specimens from the Belgian-Dutch area of distribution (Pietsch 1970).

In the first time, the muskrats introduced in 1905 were fed with corn, carrots, and potatoes. These animals must have been very prolific. During the first ten years they spread out from Dobris in concentric circles. Up to 1913 the radius of expansion increased by between four and thirty km annually. A natural barrier was formed by the mountain chains at the borders in the north and west of Czechoslovakia. But it lasted only till 1914 that the first muskrat was trapped in Bavaria, Southern Germany. The border was crossed by the animals in the district of the Regen river. This place is at a distance of about 140 km air line from Dobris.

Since the first introduction of muskrats into Czechoslovakia, several others happened. Most of the animals were farmed for fur production, but in later times the animals often escaped and settled down, like in Poland, France, Belgium, Finland, and England. In England muskrats were completely eradicated in 1936. Now it is prohibited by law to introduce them again.

In Russia muskrats have also been introduced several times and in great numbers from many sources. Also there they breed well in nature and spread, so that their range in Europe and northern Asia now covers a larger area than in North America. Nearly 1 million skins are harvested and brought to the market each year in the Soviet Union alone. This makes it understandable why the value of muskrat furs is so low. Especially in Germany this is one reason out of many why we have so many difficulties to keep the population of muskrats at a low level.

Although the harvest of muskrat-skins in Russia is important, the damage caused by the animals has outweighed the profit from sales more and more. Therefore in recent times many efforts have been made to get rid of them again. Traps are not effective enough. So poisons are tried and there is a search for infectious diseases to control the animal more effectively.

At present practically all countries of central and western Europe north of the Alps (with the exception of Great Britain) have their muskrat problems, too. The motivation why we try to exterminate muskrats in our countries is that they are extremely injurious to embankments of rivers and lakes. When they settle down in dikes at the seashore this may be threatening the lives of many people. It happens often that in the springtime river banks break where muskrats have worked and great parts of agricultural farmland is damaged by flooding. Undermining of roadways and railway embankments are no rare events and repairs to cure the constant damage are very expensive. Also in fishing areas muskrats are a nuisance because they often disturb the nets and other equipments to trap fish. In rural districts they damage cultivated farmland especially in fields with corn and sugar beet where they are biting off the growing tops and gnawing the roots. In some areas muskrats

are also carriers of *Leptospira icterohaemorrhagiae*, which causes Weil's disease in man, usually transmitted through contact with water contaminated by rat excreta.

In Germany it has been tried to exterminate the new settlers at the very beginning of their colonization. But it lasted till 1917 that the first decree (in Bavaria) demanded that landowners were obliged to trap or shoot muskrats wherever the animals appeared. Later on also a bounty was paid. The same happened in Saxony in 1918. Other provinces followed these examples in later years. Some professional trappers were employed but the bulk of the muskrats were trapped by private hunters. In most cases hunters were awarded a premium for each specimen caught and sometimes their activities were encouraged by providing them with traps and suitable instruction. But all these measures could not prevent the constant spread of the animal. For the first time in 1933 a central agency for muskrat control was established with offices in Munich (Bavaria). With this organization it was possible to stop further invasions of new territories by this animal. But this lasted only till 1939. Afterwards, with World War II the official services ceased to exist, and now we have the same situation as in the beginning. In the Federal Republic of Germany, again the various "Lander" are responsible for the organization and coordination of muskrat control. This is the duty of the Plant Protection Stations of the "Lander." Under the existing legal situation, it is in fact up to organizations or persons with vested rights for the use of banks and waterways, and those responsible for their upkeep, to carry out muskrat control. Therefore the official services have first of all a supervisory function and give assistance on request only. However, it is impossible to do so with professional trappers alone. Consequently the service is interested in increasing the number of private trappers. Now the duty of the professional trappers is to train and supervise the private ones and also to control those regions where there is a threat of muskrat invasion.

The authorities are well aware that the employment of private trappers involves certain risks, even when premiums are paid. Often one can hear the opinion that this system encouraged breeding rather than control. Certainly, this has happened sometimes. But it is a far more serious problem to get a sufficient number of hunters at all.

The only practical control method has been trapping. Two types of traps, the so-called "Haargreiffalle" and a "shoretrap" are in use. The "Haargreiffalle" is set without a bait in the entrance of the den whereas the shoretrap is set with a bait at the waterline of the rivers or lakes where muskrats are living. As baits a piece of carrot or a fragrant apple are ideal. Besides this, also other traps are in use, for instance cagetraps. The use of stop-loss traps is prohibited. Also the effectiveness of these traps is not very high because trapping during wintertime in artificially made holes in the ice of ponds and lakes cannot be practiced on a large scale in this country.

According to official material provided by the different Plant Protection Stations of Germany the number of muskrats trapped annually had been, apart from minor fluctuations, of the same order of magnitude till 1942. In West-Germany the distribution of the animals was restricted essentially to Bavaria in the south and they could be held under control with the classical methods of trapping. But after World War II it took several years before a new control organization could be built up. In the meantime, the muskrats could expand their territory and they multiplied undisturbed so that in 1946 more than three times as many animals as in 1942 could be trapped. On account of the bad economic situation in our country at this time a great number of hunters were engaged in the trapping of muskrats. This lasted till 1954 and as a result the expansion of muskrats could be checked on a large scale and the number of trapped rats decreased. Then the reestablishment of our economic system showed its effects. The hunters returned to their proper jobs - the muskrats could gain more territory. A few more regions could be colonized and at present practically the whole of western Germany is settled by muskrats. Accordingly, the number of trapped rats is rising steadily. As a consequence, the reorganization of control measures has become urgent now.

Nobody believes that an eradication of the muskrat could be brought about in Germany as it has been the case in England. We would be glad if serious damage could be avoided. The same situation is prevailing in our neighboring countries. To coordinate control methods and to exchange experience, a number of international conferences within the European and Mediterranean Plant Protection Organization (EPPO) were held since 1951. Permanent participants have been Belgium, the Federal Republic of Germany, France, Luxembourg, the Netherlands, and Switzerland. Also representatives of other countries, like Austria and Yugoslavia have participated occasionally.

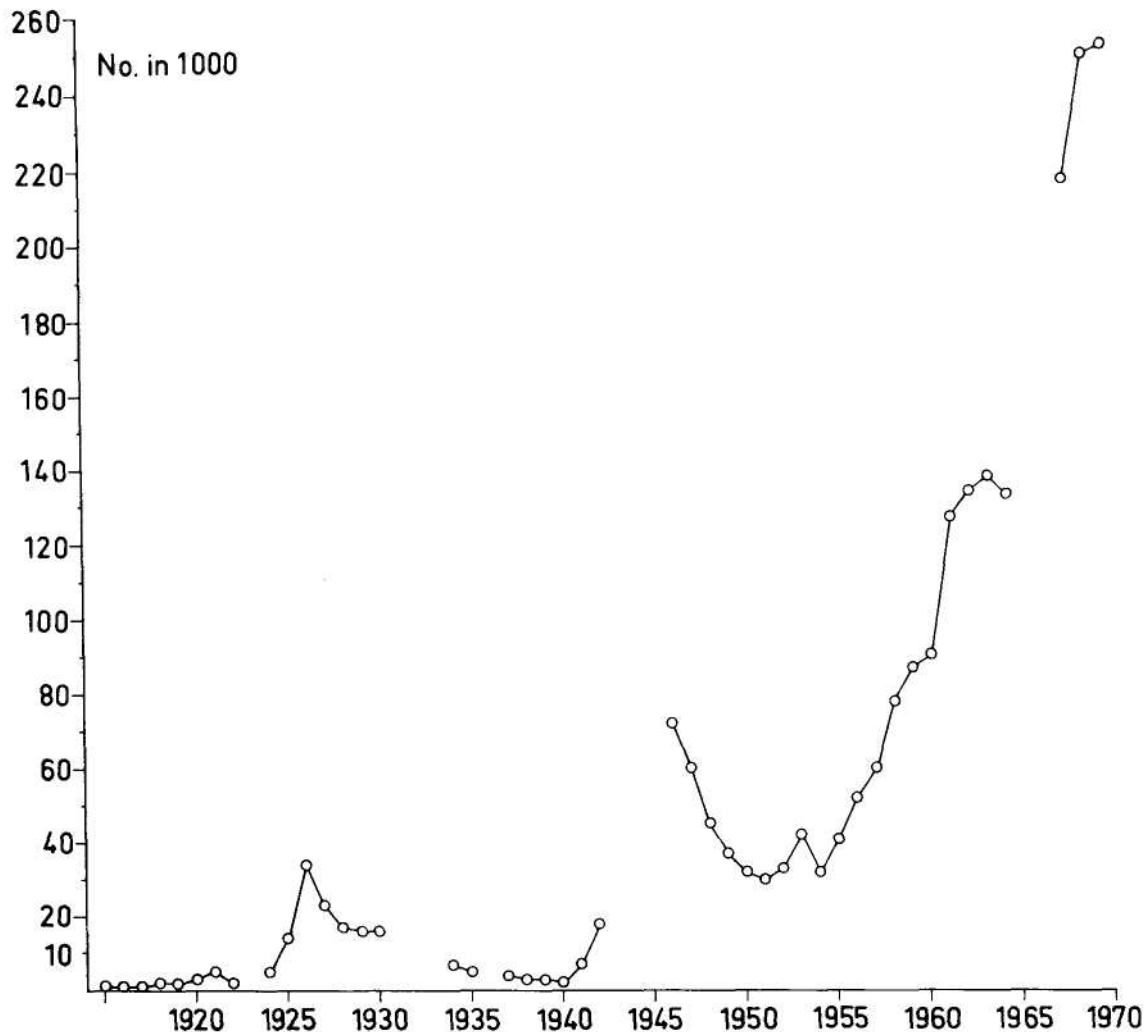


Fig 1: Trapped muskrats from 1915 - 1969 in West-Germany. Sources: Hoffmann (1958) and Jahresberichte des Deutschen Pflanzenschutzdienstes.

However, a real coordination of control measures is difficult to achieve because the legal situation is different for each country. It is the general opinion that the use of traps alone could not solve the problem of effective muskrat control. Control by trapping is meeting -with two major difficulties: The organization of trapping itself and the expenses involved. For this reason the first experiments with poisoned baits were undertaken in France and Belgium. Instead of acute poisons, anticoagulant raticides should be used to avoid hazards for man, domestic animals, and wildlife, especially fish (Giban 1968). Moens (1968) has used chlorophacinone in an oily solution. Carrots proved to be an ideal bait. To control muskrats in their natural habitat a mixture of one part carrots and three parts of beet root has been recommended. Both are sliced in pieces and mixed with chlorophacinone to a poison concentration of 0.005%. In Belgium these baits were distributed in polder-areas of 15,000 and 25,000 hectares (appr. 42,500 and 62,500 acres) at all places where muskrat signs could be seen. After one week the bait deposits had to be checked again and the baits replaced where they had been eaten. The baits were accepted readily and the killing rate of the control campaign was nearly 90% (Moens and Ghesquiere 1969).

This method could simplify the trapper's job enabling him to cover a greater area per day. Normally one man is capable of treating 1.7 km of a ditch per day for the first application and 5 km during the second. According to Van den Bruel (1968) the method has been found to be three times cheaper than trapping and in many cases to yield more satisfactory results.

These experiments seemed to be encouraging. Therefore Rau (1970) tried to apply this method in Germany, too, and he also achieved good results. In the meantime, more trials have been made in different localities but with differing results. While in Bavaria the baits were not accepted by muskrats and accordingly the success was practically zero (Mallach 1970), trials in other places of Germany met with better luck (i.g. Hesse) and success was good or at least moderate. The reason for this variation is not clear and more experiments will be necessary.

Norway rats (*Rattus norvegicus*) and water voles (*Arvicola terrestris*) which live in the same habitat as of muskrats accepted the same bait material and so could be controlled at the same time and in the same way. On the other hand wildlife and domestic animals seemed to be less exposed. In the experiments, it was not observed that deer, hare, and pheasants ate from the distributed poisoned baits. Also dogs and cats do not feed on carrots and beets. Secondary poisonings were not reported, although hawks and other birds of prey as well as foxes, polecats, and dogs are known to feed on muskrats.

At present the situation of muskrat control is still unresolved. How it goes on the future will have to show.

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